Listing of Claims:

This listing of claims will replace all prior versions, and listing, of claims in the application.

1. (Original) A system to determine the direction of a disturbance event in a power distribution system comprising:
a power feed bus for supplying electrical signals; and
a circuit monitor coupled to the feed bus;
wherein said circuit monitor is responsive to detect the disturbance event by comparing a disturbance event signal with a pre-event signal on a plurality of time scales.

2. (Original) The system of claim 1, wherein the plurality of time scales includes a point-by-point time scale; a window-by-window time scale; and a cycle-by-cycle time scale.

3. (Original) The system of claim 2, wherein the cycle-by-cycle time scale is the time for the signal to go through one full cycle.

4. (Original) The system of claim 3, wherein the window-by-window time scale is a predetermined portion of the cycle.

5. (Original) The system of claim 3, wherein the point-by-point time scale is an individual point of the cycle.

6. (Original) The system of claim 1, wherein the circuit monitor computes a confidence factor for the direction of the disturbance event.

7. (Original) The system of claim 1, further comprising an alarm channel for detecting a direction of a disturbance event, wherein the direction is measured for the alarm channel by the circuit monitor.

8. (Original) The system of claim 1, further comprising at least one coincident channel for detecting a direction of a disturbance event, wherein the direction is measured for at least one coincident channel by the circuit monitor.

9. (Original) The system of claim 1, wherein the direction of the disturbance event is computed by measuring a voltage disturbance, a current disturbance, and a power disturbance.

10. (Original) The system of claim 1, wherein the circuit monitor measures a signal-to-noise ratio and registers a disturbance event when the signal-to-noise ratio is greater than 2.

11. (Original) The system of claim 1, further comprising an alarm channel for measuring a direction of a disturbance event, wherein the circuit monitor measures the direction of a three-phase voltage and compares the direction of the three-phase voltage with the direction of the disturbance event as measured on the alarm channel.

12. (Original) The system of claim 1, further comprising an alarm channel for measuring a direction of a disturbance event, wherein the circuit monitor measures the direction of a three-phase current and compares the direction of the three-phase current with the direction of the disturbance event as measured on the alarm channel.

13. (Original) The system of claim 1, further comprising an alarm channel for measuring a direction of a disturbance event, wherein the circuit monitor measures the direction of a three-phase power and compares the direction of the three-phase power with the direction of the disturbance event as measured on the alarm channel.

14. (Original) A system to detect and determine the direction of a disturbance event in a power distribution system comprising:
a power feed bus for supplying electrical signals; and
a circuit monitor coupled to the power feed bus;
wherein the circuit monitor determines the direction of the disturbance event and computes a confidence factor for the direction of the disturbance event.

15. (Original) The system of claim 14, wherein the confidence factor is calculated using at least one of: a detection of the disturbance event on an alarm channel; a detection of the disturbance event on at least one coincident channel; an agreement of voltage, current and power disturbance events; a signal-to-noise ratio greater than 2; the disturbance direction of a 3-phase voltage agrees with an alarm channel; said disturbance direction of a 3-phase current agrees with an alarm channel; or said disturbance direction of a 3-phase power agrees with an alarm channel.

16. (Original) A system of networked metering locations in a power distribution plant, comprising:
a power feed bus for supplying electrical signals;
a plurality of branch circuits, each of the plurality of branch circuits having a branch circuit circuit monitor and coupled to the power feed bus, each of said plurality of branch circuits providing electrical signals to a load; and
wherein the branch circuit circuit monitor independently detects a disturbance event and calculates a confidence factor for the disturbance direction.

17. (Original) The system of claim 16, wherein the confidence factors of each branch circuit circuit monitor are combined to calculate a system confidence factor for the disturbance direction.

18. (Original) The system of claim 17, wherein the system confidence factor is calculated by one of the branch circuit circuit monitors.

19. (Original) The system of claim 17, further comprising a processor in communication with each of the branch circuit circuit monitors, wherein the processor combines the confidence factor of each branch circuit circuit monitor to calculate a system confidence factor.

20. (Original) The system of claim 16, wherein the power feed bus includes a power feed bus circuit monitor for independently detecting a disturbance event and calculating a confidence factor for the disturbance direction.

21. (Original) The system of claim 20, wherein the power feed bus circuit monitor receives the confidence factor from the branch circuit circuit monitor and calculates a system confidence factor.

22. (Original) The system of claim 20, wherein one of the branch circuit circuit monitors receives the confidence factor from the other branch circuit circuit monitors and the power feed bus circuit monitor and calculates a system confidence factor.

23. (Original) A method of determining the location and cause of a disturbance in an electrical power distribution plant comprising:
detecting a disturbance event signal;
measuring the disturbance event signal on multiple time scales;
comparing the disturbance event signal with a pre-event signal for each of the multiple time scales.

24. (Original) The method of claim 23, wherein the measuring the disturbance event comprises measuring on a point-by-point time scale; a window-by-window time scale; and a cycle-by-cycle time scale.

25. (Original) The method of claim 24, wherein the cycle-by-cycle time scale is the time for the signal to go through one full cycle.

26. (Original) The method of claim 25, wherein the window-by-window time scale is a predetermined portion of the cycle.

27. (Original) The method of claim 25, wherein the point-by-point time scale is an individual point of the cycle.

28. (Original) The method of claim 23, wherein the circuit monitor computes a confidence factor for the direction of the disturbance event.

29. (Original) The method of claim 23, wherein the measuring the disturbance event is performed by a single circuit monitor.

30. (Original) The method of claim 23, wherein the measuring the disturbance event is performed by a plurality of circuit monitors.

31. (Original) A method of detecting and determining the direction of a disturbance event in a power distribution system comprising:
detecting a disturbance event signal;
determining the direction of the disturbance event signal; and
computing a confidence factor for the direction of the disturbance event signal.

32. (Original) A method of claim 31, wherein said confidence factor is calculated by measuring at least one of: a detection of said disturbance event on an alarm channel; a detection of said disturbance event on at least one coincident channel; an agreement of voltage, current and power disturbance events; a signal-to-noise ratio greater than 2; a disturbance direction of a 3-phase voltage agrees with an alarm channel; a disturbance direction of a 3-phase current agrees with an alarm channel; or a disturbance direction of a 3-phase power agrees with an alarm channel.

33. (Original) A method of determining the location and cause of a disturbance in an electrical power distribution plant comprising combining the confidence values from a plurality of networked metering locations in a power system and expressing a confidence in that analysis.

34. (Original) The method of claim 33, wherein said confidence factor is calculated by measuring at least one of: a detection of said disturbance event on an alarm channel; a detection of said disturbance event on at least one coincident channel; an agreement of voltage, current and power disturbance events; a signal-to-noise ratio greater than 2; a disturbance direction of a 3-phase voltage agrees with an alarm channel; a disturbance direction of a 3-phase current agrees with an alarm channel; or a disturbance direction of a 3-phase power agrees with an alarm channel.